







Knowledge on tilt concept in Implantology among dentists of Maharashtra

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Abstract

Background: Dental implants are widely used for replacing missing teeth. The placement of standard length dental implants in axial position requires adequate amount of bone to be present. In certain conditions when remaining bone volume is less or the proximity of vital structures (inferior alveolar nerve, mental nerve, and the maxillary sinus) is there, advanced surgical procedures are required to allow the placement of standard-length implants. Such procedures are usually associated with increased morbidity, higher cost, and longer treatment duration. **Aim:** The aim of the study is to know about the knowledge of the TILT concept in implant among the dentists in Maharashtra **Methods:** A cross-sectional questionnaire study was conducted among the dentist of Maharashtra. The sample size of 200 dentists. A close-ended questionnaire was used to assess the practitioner's perspective on tilted implants. Survey software was used to reduce sampling bias. Repeated answers or questioning were avoided. Chi-square tests were applied to find the association between the parameters and the level of significance. **Results:** Out of 200 practitioners, only 45% of the practitioners had knowledge about the TILT concept in implant and the other 55% were not aware. And only 32.5% of the practitioners were aware of the indications for tilted implants whereas 67.5% of them responded that they don't know under what conditions tilted implants are used **Conclusions:** Within the limitation of the study, we can conclude that dental practitioners in the Maharashtra population were not much aware of the tilted implants and their uses and advantages over other techniques.

Keywords: All on four, all on six, tilted implant concept

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Introduction

Dental implants are widely used for replacing missing teeth. The placement of standard-length dental implants in axial position requires adequate amount of bone to be present. In certain conditions when remaining bone volume is less or the proximity of vital structures (inferior alveolar nerve, mental nerve, and the maxillary sinus) is there, advanced surgical procedures are required to allow the placement of axial implants. Such procedures are usually associated

with increased morbidity, higher cost, and longer treatment duration. The alternative treatment in such cases is to intentionally tilt the implant.¹

In recent times, dental implant supported prosthesis (implant over dentures) has also been given which offered many advantages such as improved retention and support, reduced size prosthesis, better speech, and enhanced masticatory ability when compared to the conventional complete denture methods.^{2,3}

Full mouth implantation is a conventional technique which works on the placement of implants and keeps them undisturbed for subgingival healing till osseointegration of bone takes place. These implants are uncovered only after the subgingival healing which takes for approximately 3 to 6 months basically depends on various factors like bone density, occlusal load, implant dimensions etc. and restored in function once the soft tissue get heal in next 3 to 4 weeks.^{4,5} This is difficult in many cases because edentulous patients usually do not have adequate bone dimensions for the placement of implants.

The Implants can also be placed in resorbed completely edentulous arches using All on four and All on six concepts. Four to six vertical implants placed within the anterior segment of the edentulous maxilla and mandible, which are cantilevered to adapt a full-arch fixed prosthesis.⁶ Malo, Rangert & Nobre (2003) combined the use of intentionally tilted posterior implants with a minimal number of implants that were functionally loaded on the day of implant placement. This treatment approach was described as the “all-on-four” technique. The investigations found a high level of predictability for this treatment in both jaws.⁷

In this technique, four implants are placed in the anterior region of the jaw between the two mental foramina in the mandible and between the mesial walls of the maxillary sinus in the maxilla. The two anterior implants follow the jaw anatomy and the two distal implants are tilted at 45° angulations. For placing tilted implants these factors need to be considered that the primary stability of implants should be 35 – 45 Ncm, absence of severe parafunctional habits, tilt the posterior

implants. It does not require a wider opening of the mouth. It is advisable to place implants between extraction sockets. Indicated with a minimum bone width of 5mm and minimum. Bone height of 10mm from canine to canine in maxilla and 8mm in mandible. If angulation is 300 or more, the tilted implants can be splinted. For tilted posterior implants, the distal screw access holes should be located at the occlusal face of the first molar, the second premolar, or the first premolar.

There are many advantages of tilted implants which includes: Avoids complex surgery, Less invasive procedure for the pt., graft less procedure, implants well-spaced, good biomechanics, easier to clean, immediate function and aesthetics, simplified surgical & prosthetic procedure, reduced cost due to less number of implants, high success rates, avoid anatomical structures, allow longer implants anchored in better quality bone, Reduces posterior cantilever. Disadvantages include: Length of cantilever in the prosthesis cannot be extended beyond the limit, free hand arbitrary surgical placement of implant is not always possible as implant placement is completely prosthetically driven, It is very technique sensitive and requires elaborate presurgical preparation such as CAD/CAM, surgical splint. Treatment Protocol Consists of Two Phases: Surgical and Prosthetic.⁵

The aim of the study is to know about the knowledge of the TILT concept in implant among the dentist in Maharashtra.

Materials and methods

Data collection

This was a questionnaire based study was conducted in June 2023 among general dental practitioners. It was an online questionnaire-based study, conducted to assess the Knowledge on the TILT concept in implants among the dentists. 200 dentists participated in this study. The data collection was done via Google forms.

Survey instrument

A structured questionnaire containing 10 questions was framed. The goal of developing this questionnaire was to know about the Knowledge, attitude, and practice of the TILT concept in implants among the general dental

practitioners. The questions had to be answered with a Yes or No response.

Data analysis

The data collected was entered into an Excel sheet and subjected to statistical analysis using SPSS version 20. A Chi-square test was done. The level of significance was set at $p < 0.05$.

A questionnaire given is as follows:

1. Clinicians Experience: Less than 5 years, 5-10 years, More than 10 years
2. Are you aware of tilt concept in implantology?
3. Are you aware of what all conditions where tilted implants are placed?
4. Do you know the tilt concept is alternative to replacing maxillary posterior teeth without bone grafting?
5. Are you aware of the advantages of tilt concept over the conventional methods?
6. Are you aware of the steps and clinical procedures involved in placing tilted implants?
7. Do you know any other concepts of placing implants in compromised completely edentulous patients?
8. Do you think tilted implants can be used in partial edentulous patients?
9. Do you think tilted implants will provide enough support to prosthesis?
10. Do you think force acting on tilted implants will lead to bone loss over the period of time?

Results

200 general dental practitioners were selected as the study population for this survey. Out of 200 practitioners, 33% of them had less than 5 years of experience, 46% of them had 5-10 years of clinical experience and 21 % of the practitioners had more than 10 years of clinical experience.(figure-1) Out of 200 practitioners, only 45% of the practitioners had knowledge about the TILT concept in implant and the other 55% were not aware. (Figure-2) only 32.5% of the practitioners were aware of the indications for tilted implants whereas 67.5% of them responded that they don't know under what conditions tilted implants are used. (Figure 3)

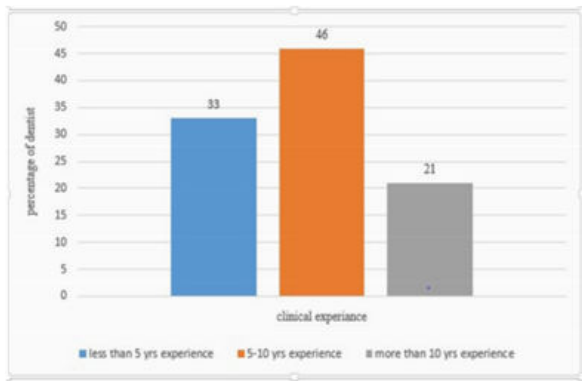
However, 28% of them responded that they are aware of tilted implants are used in the maxillary posterior segment without bone grafting for the replacement of teeth. However, the practitioners did not have much knowledge about the advantages of tilted implants over conventional or other methods. Only 30% of them were aware of the benefits of tilted implants.(Figure4). A maximum number of practitioners responded that they were not aware (79%) about the steps and clinical procedures involved in placing tilted implants. (Figure 5)

Tilted implants are placed anterior to the maxillary sinus on the mesial aspect, so that the implant threads are engaged in the cortical bone, without invasion or rupture of the Schneiderian membrane⁸. Apart from the TILT concept, there are other methods and concepts such as "All on 4" and "All on 6" that are used in anatomically compromised completely edentulous patients. However, 65% of the practitioners were not aware of any of these concepts or methods.

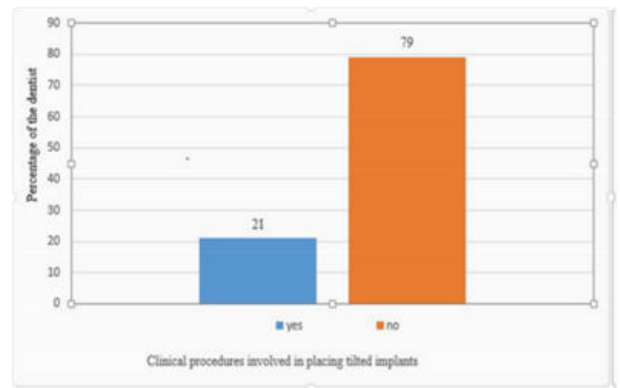
Studies have shown that the All-on-Four surgical, distal tilted implants and the prosthetic procedure were proposed to be used in edentulous arches without any bone augmentation procedures. ¹⁰Studies have also shown that tilted implants can also be placed in partially edentulous patients also.¹¹But from our study, 73% of the practitioners did not know about tilted implants that can be used in partially edentulous patients. Furthermore, it is also shown that 60% of the practitioners responded that tilted implants can cause bone loss due to forces acting on them by implants (Figure 6) And 65.5% of them also perceive that tilted implants can't support prosthesis. (Figure 7)

The associations between clinicians' experience and their awareness of the TILT concept. Maximum awareness about the TILT concept was seen in practitioners whose experience was more than 10 years (14%). p -value- 0.015 (< 0.05), hence statistically significant. (Figure-8)

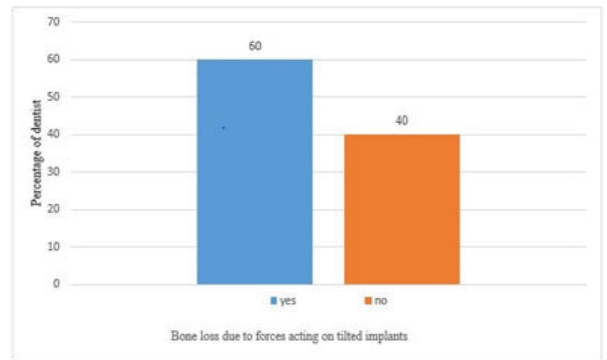
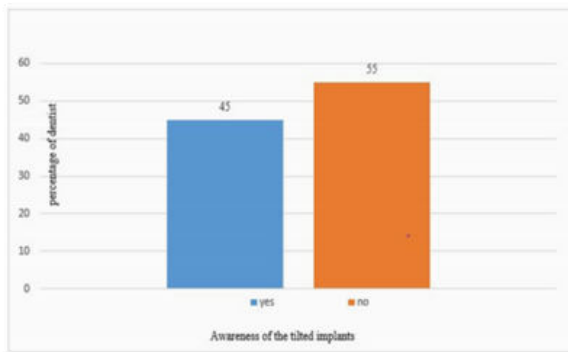
Resorption and reduction in bone density are the outcomes of long term edentulous arches. These features may require bone grafting before implants are placed. Bone augmentation techniques such as sinus augmentations and nerve transposition are traditional approaches for compromised bone density. But these procedures are highly expensive and procedures involve longer duration.



Distribution of dentists based on their clinical experience (Fig-1)

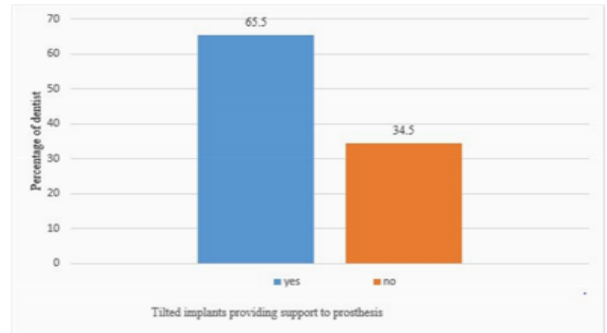
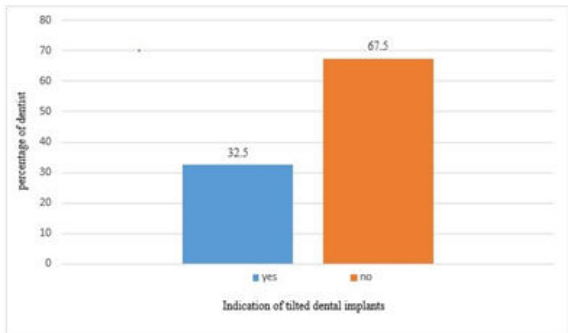


Awareness on clinical procedures for tilted implants (Fig-5)



Bone

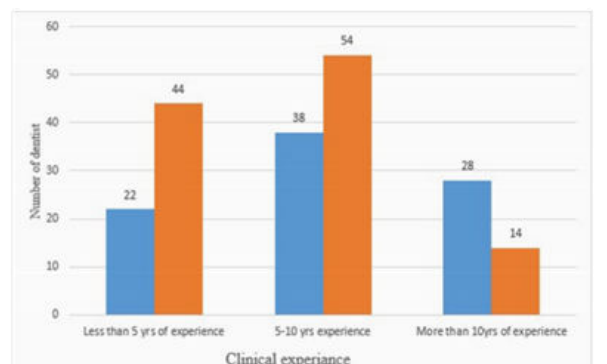
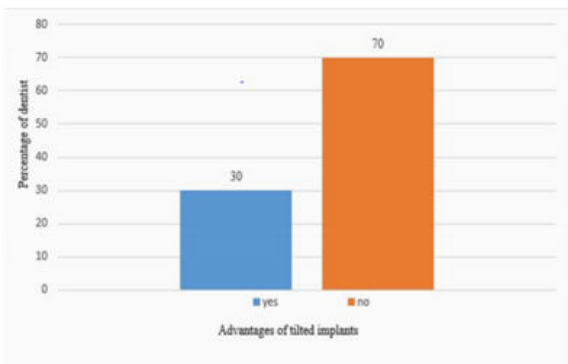
loss in tilted implants (Fig-6)



Den-

tists opinion on prosthesis support in tilted implants (Fig-7)

Awareness on tilted implants (Fig-2)



Gen-

practitioners awareness on tilted implants (Fig-8)

eral

Awareness on indications for tilted implants (Fig-3)

However long distal cantilevers, short implants, or implants placed into the zygoma or pterygoid plate are the alternative techniques that are advantageous than conventional bone augmentation procedures offer advantages but require significant expertise for inevitable success. Studies indicate that utilization of the all-on-four protocol with immediate loading and short implants in an atrophic mandible was shown to be a viable alternative option to treat patients with extremely resorbed alveolar ridges.¹²

Discussion

The study conducted among general dental practitioners in Maharashtra aimed to assess their knowledge and awareness of the TILT concept in dental implants. The results reveal a significant gap in understanding among the surveyed practitioners, highlighting opportunities for enhanced education and training in advanced implant techniques. Only 45% of the surveyed practitioners were aware of the TILT concept in implantology, indicating a notable portion of the dental community in Maharashtra may not be familiar with newer implant placement strategies. This finding aligns with similar studies that have shown varied awareness levels among dental professionals regarding advanced implant techniques.^{13,14} A substantial proportion (67.5%) of respondents demonstrated a lack of knowledge about the specific clinical indications for tilted implants. These implants are particularly advantageous in scenarios where conventional approaches are challenging due to reduced bone volume, especially in the posterior maxilla without the need for extensive bone grafting.⁹ Educating practitioners about these indications could lead to improved treatment outcomes and patient satisfaction.

Moreover, the study found that only 30% of practitioners were aware of the benefits associated with tilted implants over conventional methods. These benefits include reduced invasiveness, simplified procedures, and potentially lower treatment costs due to the fewer number of implants required.¹³ Concerns expressed by respondents, such as long-term success rates and potential bone loss associated with tilted implants, underscore

the need for comprehensive education on the biomechanics and clinical outcomes of these techniques. Significantly, clinicians with more than 10 years of experience demonstrated higher awareness of the TILT concept, indicating that professional experience and exposure play a critical role in the adoption of advanced implant techniques.¹⁴ However, to bridge the knowledge gap for less experienced practitioners, targeted educational programs and workshops focusing on the TILT concept could be instrumental. In conclusion, this study highlights the need for continuing education initiatives to enhance awareness and understanding of advanced implant techniques among dental practitioners in Maharashtra. By addressing these educational gaps, dental professionals can offer more comprehensive treatment options to their patients, potentially improving clinical outcomes and reducing treatment complexities and costs associated with traditional approaches like bone grafting.

Limitations

This study includes its cross-sectional design and reliance on self-reported data, which may introduce bias. Additionally, the study's focus on a specific geographic region limits its generalizability to other populations with different educational backgrounds or healthcare systems. Future research could explore longitudinal studies to evaluate changes in awareness and adoption of advanced implant techniques following targeted educational interventions. Comparative studies assessing clinical outcomes and patient satisfaction between tilted implants and traditional approaches would provide valuable insights into the efficacy and benefits of these newer techniques.

Conclusion

Dentists in the Maharashtra population are now taking more interest in placing tilted implants. More continuing dental education and workshop programs need to be conducted to increase the awareness about tilted implants, their use, advantages and the surgical procedures for placing these implants.

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References

1. Singh AV, Singh S. Tilted Implant Concept for Full Mouth Immediate Loading Restoration. *Int J Oral Implantol Clin Res* 2014;5(1): 12-23
2. Thomason JM, Feine J, Exley C. Mandibular two implant-supported overdentures as the first choice standard of care for edentulous patients. *Br Dent J* 2009 Aug 22;207(4):185-186.
3. Singh AV, Singh S, Rojo AV. Quality life for elderly edentulous patients with implant over dentures, implantology section. *Dental Practice* 2013 May-June;11(6):22-25.Dr.
4. Shreya H. Mantri, et. al. "The New Alternative to Conventional Dentures- All On 4 Dental Implant Treatment Concept: A Review Article." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(03), 2021, pp. 26-37
5. Lin W-S , Eckert SE . Clinical performance of intentionally tilted implants versus axially positioned implants: A systematic review .*Clin Oral Impl Res* . 2018 ; 29(Suppl. 16) : 78 – 105
6. Zitzmann NU et al. Treatment outcomes of fixed or removable implant - supported prostheses in the edentulous maxilla Part I: patients assessments. *J Prosthe Dent* 2000, 83:424-433.
7. JI Stoeenga PJW et al. Reconstruction of the severely (class VI) maxilla. A two-step procedure. *Int J Oral Maxillo fac Surg* 1994; 23:219-225.
8. Jensen OT, Adams MW, Cottam JR, Parel SM, Phillips WR 3rd. The All-on-4 shelf: maxilla. *J Oral Maxillofac Surg*. 2010 Oct;68(10):2520-7. doi: 10.1016/j.joms.2010.05.082. PMID: 20863943.
9. Maló P, Rangert B, Nobre M. ‘All-on-Four’ immediate function concept with Brånemark System implants for completely edentulous mandibles: a retrospective clinical study. *Clin Implant Dent Relat Res* 2003;5:S2-S9.
10. Maló P, Rangert B, Nobre M. ‘All-on-4’ immediate-function concept with Brånemark System implants for completely edentulous maxilla: a 1-year retrospective clinical study. *Clin Implant Dent Relat Res* 2005;7:S88 -S94
11. ortin T, Isidori M, Bouchet H. Placement of posterior maxillary implants in partially edentulous patients with severe bone deficiency using CAD/CAM guidance to avoid sinus grafting: a clinical report of procedure. *Int J Oral Maxillofac Implants*. 2009 Jan-Feb;24(1):96-102.
12. Ho CC, Jovanovic SA. The "All-on-4" concept for implant rehabilitation of an edentulous jaw. *Compend-Contin Educ Dent*. 2014
13. Chrcanovic BR, Albrektsson T, Wennerberg A. Reasons for failures of oral implants: a review. *J Oral Rehabil*. 2014;41(6):443-476.
14. Malo P, de Araújo Nobre M, Lopes A. The rehabilitation of completely edentulous maxillae with different degrees of resorption using four or more immediately loaded implants: a 5-year retrospective study and a new classification. *Eur J Oral Implantol*. 2011;4(3):227 -243.
15. Attard NJ, Zarb GA. Long-term treatment outcomes in edentulous patients with implant overdentures: the Toronto Study. *Int J Prosthodont*. 2004;17(4):425-433.